Photography: Westlands Water District

California's Drought Update

March 1, 2010

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California's Drought Update

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Introduction

This drought bulletin provides a monthly update to California's water conditions. As the winter season is upon us, reservoir conditions have typically reached their lowest levels after summer demands. The total statewide October 2009 through January 2010 precipitation was 104 percent of average.

Information in the update is based on hydrologic data compiled through the end of January. This month's report includes: updated information on hydrologic and water supply conditions; local drought impacts; a discussion on historical drought periods; impacts by hydrologic region; and the status of drought emergencies declared by counties. Additional drought information can be found on the drought website.

http://www.water.ca.gov/drought/.

Hydrologic and Water Supply Conditions

Precipitation

The 2009 Water Year (October 1, 2008 through September 30, 2009) was the third consecutive year of below average precipitation for the state. Annual statewide precipitation totaled 76 percent, 72 percent, and 63 percent of average for Water Years 2009, 2008, and 2007, respectively.

Table 1 compares the average monthly contribution to statewide precipitation to the observed precipitation from Water Years 2009 and 2010 (to date). January, April, July, August, September, and November 2009 were exceptionally dry while February, May, June, and October 2010 were well above average. However, Water Year 2009 finished at 76 percent of an average water year. Water Year 2010 through January stands at 104 percent of average. An above average precipitation for the month of January has helped to bring the 2010 water year average total above normal.

Month of Water Year	Avg CA Precip (inches)	WY 2009 Observed	% of Average	WY2010 Observed	WY 2010 % of Avg
October	1.22	0.73	60%	2.07	169%
November	2.80	2.49	89%	0.77	28%
December	3.91	3.05	78%	3.33	85%
January	4.35	1.26	29%	6.55	188%
February	3.66	5.06	138%		
March	3.12	2.13	68%		
April	1.64	0.59	36%		
May	0.89	1.47	165%		
June	0.35	0.46	133%		
July	0.18	0.02	11%		
August	0.28	0.06	20%		
September	0.48	0.09	19%		
Total	**22.88**	**17.40**	**76%**	**12.72**	**104%**

Table 1. Average statewide precipitation by month with statewide precipitation values from Water Years 2009 and 2010. Data from California Climate Tracker (Western Region Climate Center): http://www.wrcc.dri.edu/monitor/cal-mon/frames_version.html

February precipitation through the February 22, 2010 is slightly below average February rainfall (see Meteorology and Hydrology section for updated numbers). Current equatorial sea surface temperature data indicates warm conditions above the El Nino threshold. These conditions are expected to continue at least into the Northern Hemisphere Spring 2010 based on a February 22 update by NOAA's Climate Prediction Center. The prevailing conditions may enhance the chances of increased precipitation throughout the upcoming winter months, although there have been several El Niño periods in recent decades that have produced drier than average statewide conditions.

The Northern Sierra 8-Station and San Joaquin 5-Station Precipitation Indices track the wetness of the Sacramento and San Joaquin River basins. These indices help correlate the health of the runoff into Central Valley reservoirs. Currently the 8-Station Index is at 96 percent of annual average with the 5-Station Index fairing slightly better at 102 percent of annual average. The averages for the 8-Station and 5-Station indices are 50.0 and 40.8 inches, respectively. Figures 1 and 2 show the current indices values compared to other Water Years.

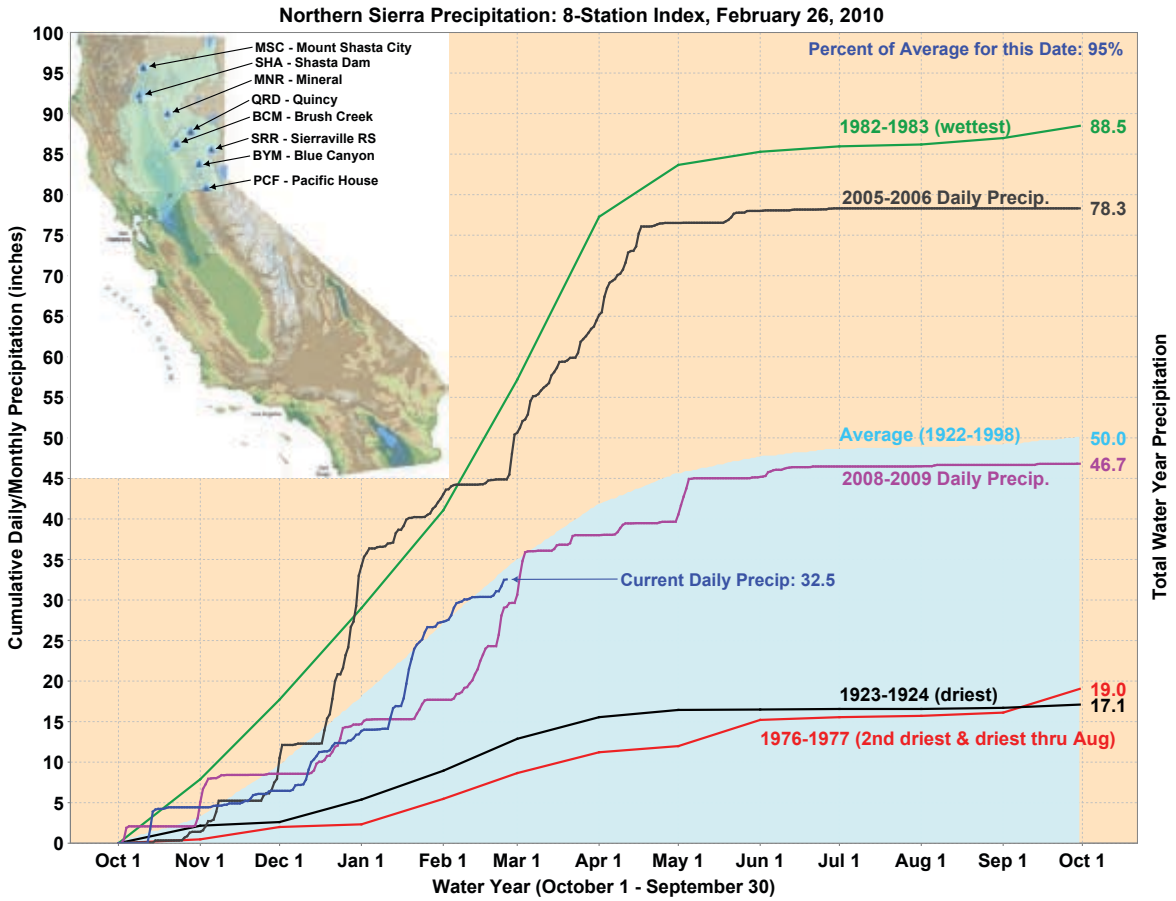

Figure 1. Northern Sierra 8-Station Precipitation Index

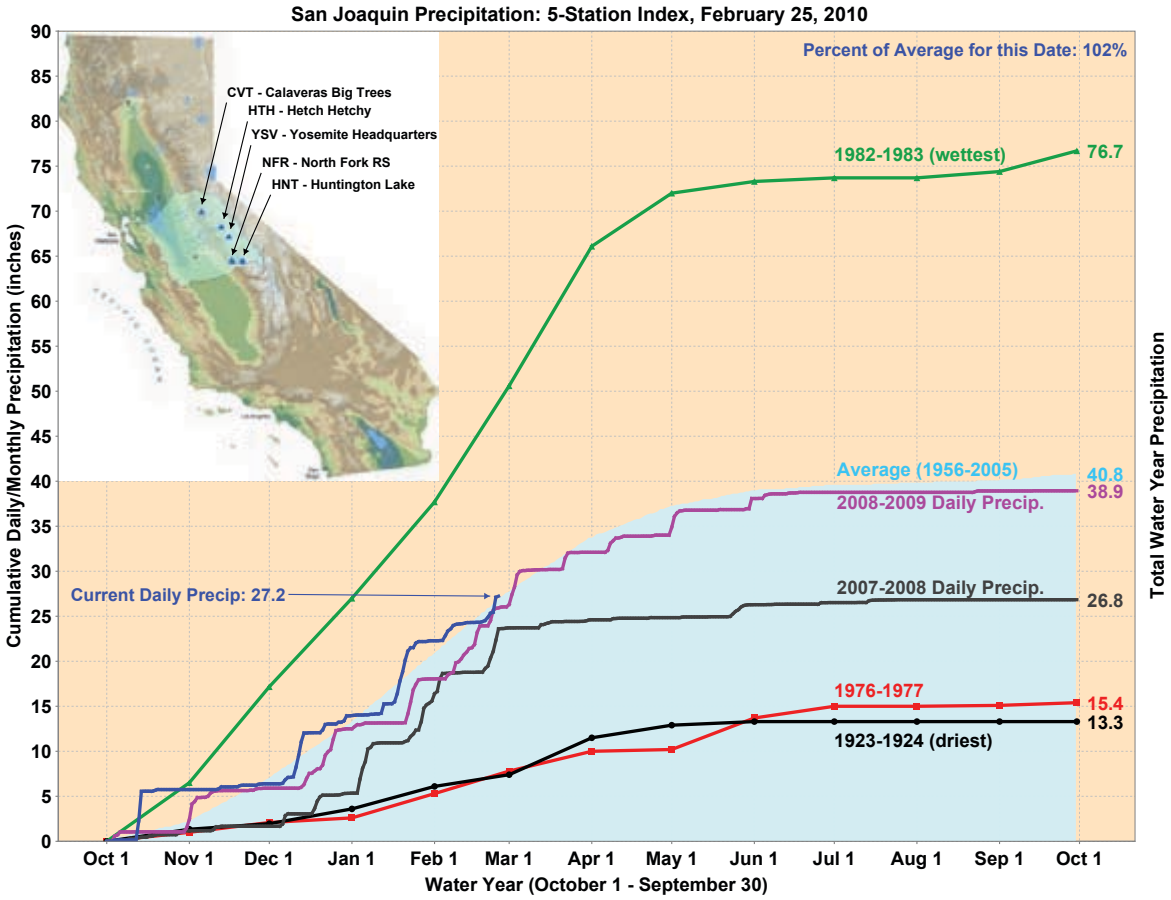

Figure 2. San Joaquin 5-Station Precipitation Index

Snowpack

As of February 25, 2010 the statewide snowpack stands at 25 inches, which is 103 percent of average to date and 87 percent of the average April 1st (typical date of maximum snow accumulation) snowpack. During Water Year 2009, the snowpack peaked on March 25, 2009 at 25 inches, which was 88 percent of the average April 1st snowpack.

Reservoir Storage

Statewide reservoir storage at the end of Water Year 2009 was over 17 MAF or about 80 percent of average and 46 percent of capacity for the date, with individual key reservoirs much lower. Statewide reservoir storage on February 25, 2010 was 14.5 MAF which is about 84 percent of average and 56 percent of capacity. Figure 3 shows the condition of the state's larger reservoirs as of February 24, 2010.

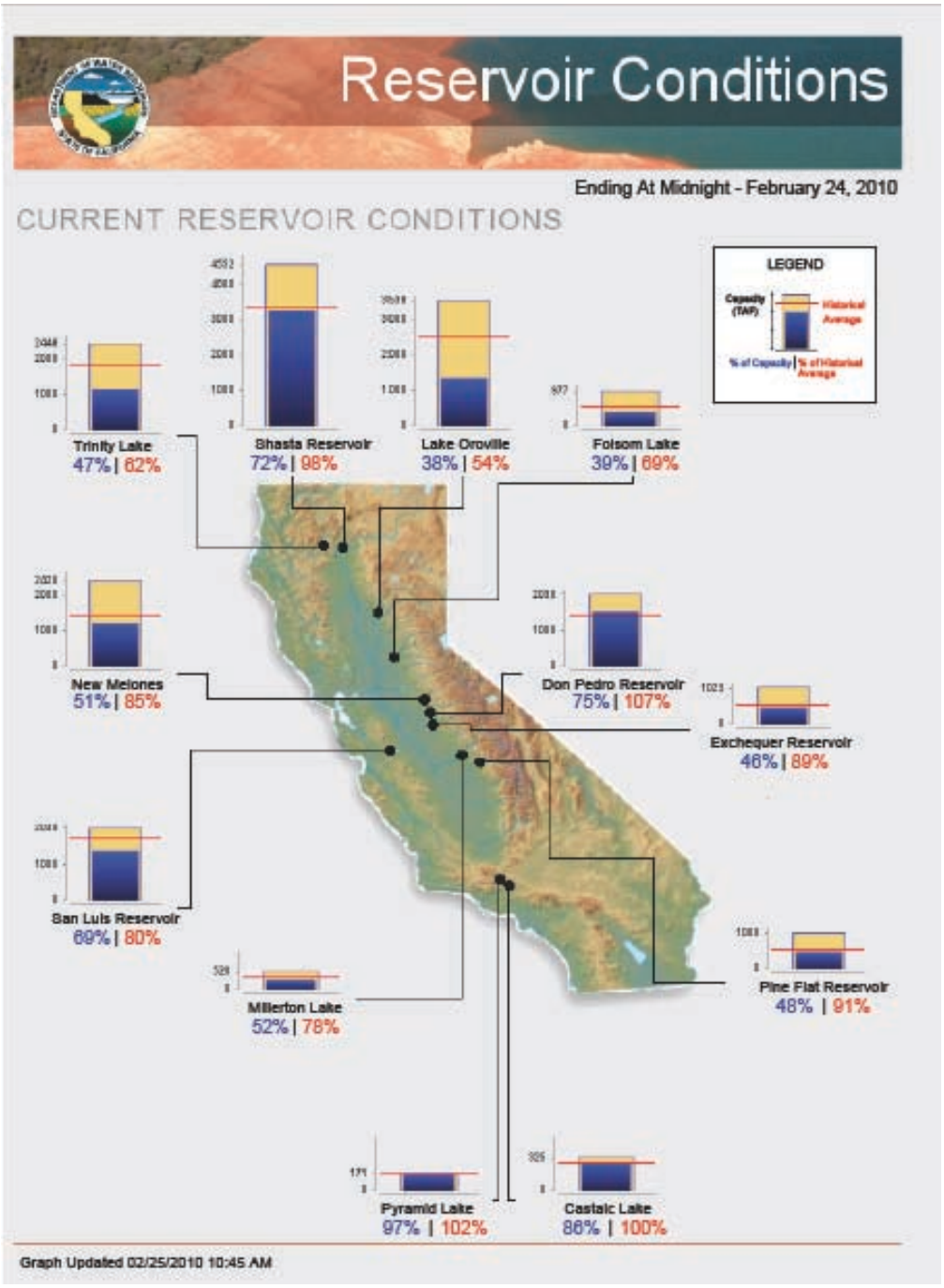

Figure 3. Reservoir storage for select reservoirs shown as percent of capacity (blue) and percent of average (red). Source: http://cdec4gov.water.ca.gov/cgi-progs/products/rescond.pdf or http:// cdec4gov.water.ca.gov/cgi-progs/reservoirs/RES/

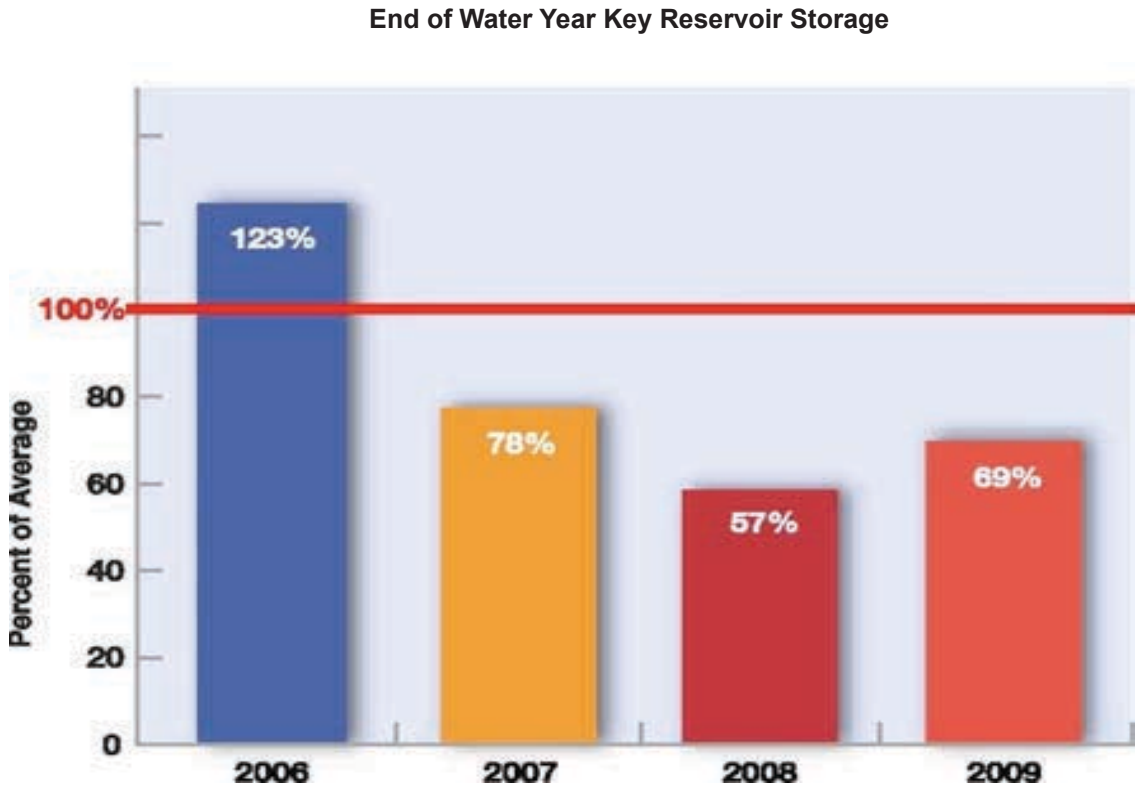

Figure 4. Percent of average end of water year storage for key reservoirs from 2006-2009. ("key reservoirs" comprise Trinity, Shasta, Oroville, Folsom, Don Pedro, New Melones, and San Luis reservoirs)

Figure 4 shows storage for key reservoirs for the end of the last four water years, including the end of this water year on September 30, 2009. The three-year drought, from 2007 to the present, was evident in the well-below normal storage readings. The state entered the 2009-2010 Water Year with its key supply reservoirs at only 69 percent of average. As of February 25, 2010, the summation of storage in the "key reservoirs" was 80 percent of average.

Runoff

Figure 5 shows a comparison of the percent of average annual statewide runoff from Water Years 2006 through 2010 (the 2010 value includes only runoff from October through December and will be updated throughout the Water Year). Water Year 2006 was the most recent wet year in California, with 173 percent of average statewide runoff. Water Year 2007 was the first of three dry years, ending with 53 percent of average statewide runoff. Water Year 2010 stands at 64 percent of average to date (through January). A revised 2010 percent of average annual statewide runoff will be issued in early March for conditions through February and is expected to decrease. Eight major Sierra rivers are flowing at rates less than 50 percent of average from February 1 through February 25.

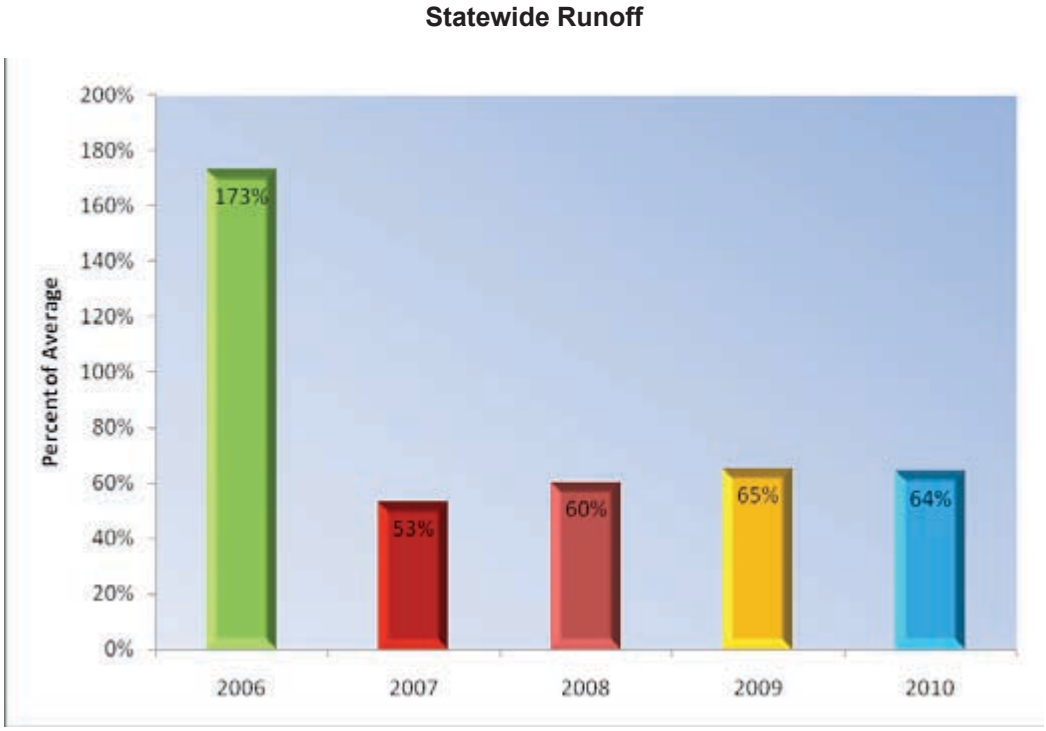

Figure 5. Statewide runoff for water years 2006, 2007, 2008, 2009 and 2010 (through January 31, 2010)

Table 2 shows the Sacramento and San Joaquin River Runoff, Water Supply Index (WSI) and year type for select water years based on observed runoff. This table includes the February 1, 2010, forecasted Sacramento and San Joaquin River Runoff, WSI and Year Type.

	Sacramento River			San Joaquin River		
Water Year	Runoff MAF	Index	Year Type	Runoff MAF	Index	Year Type
2006	32.09	0.73	W	10.44	5.9	W
2007	10.28	2.49	D	2.51	2.0	C
2008	10.28	3.05	C	3.50	2.1	C
2009	12.91	1.26	D	4.97	2.7	BN
2010	14.90	February 1, 2010 forecast		5.40	February 1, 2010 forecast	

Table 2: Sacramento and San Joaquin river runoff, WSI, and year type for select water years based on observed data (W=wet, D=dry, C=critical, BN=below normal)observed data (W=wet, D=dry, C=critical, BN=below normal)

The Sacramento River Unimpaired Runoff was forecasted to be 14.90 million acre-feet (MAF) on February 1, 2010. The San Joaquin River Unimpaired Runoff was forecasted to be 5.40 MAF on February 1, 2010. Both estimates are

expected to decrease due to the less than average accumulation of precipitation and snow this month in the Sacramento River and San Joaquin River basins. The updated runoff forecasts will be published in the March 1, 2010 DWR California Cooperative Snow Surveys Bulletin 120.
http://cdec.water.ca.gov/cgi-progs/iodir/wsi

Meteorology and Hydrology

As of January 31, 2010, statewide precipitation was 104 percent of average to date. In general, February was relatively dry, but wet enough for seasonal precipitation totals at many locations to remain near average. February also had prolonged periods of clear skies and above normal temperatures.

On February 26, 2010 the Northern Sierra 8-Station Precipitation Index Water Year total was 32.5 inches, about 96 percent of the seasonal average to date and about 65 percent of an average water year (50 inches). Last year on February 26, 2009, the seasonal total to date was 29.0 inches, about 86 percent of the seasonal average to date. As of February 25, 2010 the month's total precipitation for the 8-Stations was 5.3 inches, about 66 percent of average for the month. Also on February 25, 2010 the San Joaquin 5-Station Precipitation Index had a seasonal total of 27.2 inches about 102 percent of the seasonal total to date. Other water supply regions of the State have not received as nearly as much rainfall.

Climatology

The latest National Weather Service Climate Prediction Center (CPC) long-range weather outlook for March 2010, issued February 18, 2010, forecasts an increased chance of above average precipitation for all of California except for the northern portion of the State. The CPC 90-Day long-range weather outlook for March through May, also issued February 18, suggests an increase chance above average precipitation for Central and Southern California.

State Water Project Allocations

On February 26, 2010 the Department of Water Resources (DWR) increased anticipated 2010 State Water Project (SWP) deliveries to California's water contractors from five to 15 percent of requests. If this amount remains unchanged by the final allocation in late spring this will be the lowest allocation percentage in the project's history.

Lake Oroville is at only 54% of its average storage level for this time of year. And while San Luis Reservoir is at 80% of normal for this time of year, the vast majority of that supply is unavailable for this year's allocation. Most of the supply in San Luis is earmarked for individual water contractors who are trying to stretch these supplies carried over from previous years in the most efficient way they can manage though these dry years. So SWP supplies in two key reservoirs are well below where we need them to be.

Another hydrologic condition affecting the allocation amount is the condition of the watershed. After three years of drought in California, the watershed is dry and will likely absorb more of the snowpack. Therefore, less runoff from the snowpack is expected.

The allocation at this time of year is a very conservative estimate. As winter progresses and the Department has a clearer picture of water conditions, the allocation can be increased. There is a 90 percent chance that the allocation will improve by late spring. If we continue to have an average year, the final allocation will likely be in the range of 35-45 percent of requested amounts. That spread is based on how the biological opinions to protect fish species are applied and how much flexibility the Department has to pump water.

In 2009, the State Water Project delivered 40 percent of customer requests. The federal Central Valley Project was only able to deliver 10 percent of contracted amounts to some agricultural areas in the San Joaquin Valley.

The reduced deliveries were due both to dry weather and fishery agency restrictions on pumping to protect fish species; principally Delta smelt, salmon, and longfin smelt.

The historical average of final State Water Project allocations over the past 10 years has been 68 percent of contractors' requests.

A notice to SWP contractors appears on DWR's State Waster Project Analysis Office Web site at: http://www.swpao.water.ca.gov/notices/.

Central Valley Project Allocations

On February 26, 2010 Secretary of the Interior Ken Salazar today announced the Bureau of Reclamation's Initial 2010 Central Valley Project (CVP) Water Supply Forecast and steps the United States government is taking to seek additional water supplies for drought-stricken farmers. Snowpack and runoff forecasts are significantly improved over the past three years and, if current weather patterns continue, California may have an "average" or better water year.

If 2010 is an average water year, allocations can be anticipated as follows:

- Senior agricultural water users along the Sacramento and San Joaquin rivers will be allocated 100 percent of their contract quantities (approximately 2.4 million acre feet);
- Friant Division agricultural water service contractors will be allocated 100 percent of Class 1 water;
- Eastside Division agricultural contractors (Stanislaus River) will be allocated 100 percent of their contract quantities (155,000 acre-feet);
- Agricultural water service contractors north of the Delta will be allocated 100 percent of their contract quantities;
- Agricultural water service contractors south of the Delta will be allocated 30 percent of their contract quantities;
- Municipal and industrial water service contractors north of the Delta will be allocated 100 percent, and those south of the Delta, 75 percent;

- Wildlife refuges north and south of the Delta will be allocated 100 percent of their "Level 2" water (approximately 400,000 acre feet).

These potential allocations are good news for the large majority of water users served by the Central Valley Project; however, the three previous years of drought and uncertainty regarding this water year present serious water supply challenges for west valley south of Delta agricultural water service contractors. In recognition of this fact, Secretary of the Interior Ken Salazar has directed the Department of the Interior to work with other federal and state agencies and other parties to secure additional water opportunities for farmers south of the Delta.

Although current weather patterns suggest that 2010 may be an average or better water year for California, the Bureau of Reclamation and the State of California also provide an official allocation at this time of year. That allocation is based on a "dry year" forecast which assumes, essentially, that there is little or no additional precipitation over the balance of the water year. Under this scenario, some junior agricultural interests north and south of the Delta would receive an allocation of 5 percent of their water service contracts. For more detailed information about the initial 2010 Central Valley Project water supply forecast, go to <http://www.usbr.gov/mp/pa/water> http://www.usbr.gov/mp/pa/water

Local Impacts and Responses to the Drought

In response to the Governor's Drought Proclamation in 2009, DWR and the California Department of Food and Agriculture (CDFA) are cooperating on a statewide 2010 survey of agricultural drought and water shortage impacts which will involve personnel from selected County Agricultural Commissioner Offices. CDF&A officials plan to conduct up to three surveys during 2010. The surveys will gather information on drought-induced fallowed acres, unirrigated acres, failed acres, and abandoned acres, as well as the monetary and employment losses associated with these water shortage impacts.

In early February DWR completed a drought impacts survey of selected County Economic Development Corporations. Based on the results of that survey, plus earlier DWR drought impacts surveys done in 2009, it appears that agriculture in Fresno, Kings, and Kern Counties is being hit the hardest by the continuing drought and water shortages. The agricultural impacts, in terms of lost revenues and higher unemployment, are being multiplied throughout the overall regional economy. The water shortages may also be making it more difficult to attract new agricultural-based companies to the area.

North Coast, Bay Area, and Sacramento River Hydrologic Regions — The month of February continues to improve local water supplies, especially for Lake Mendocino. In November, 2009 the Mendocino County Board of Supervisors amended an ordinance requiring a 50 percent mandatory requirement on communities affected by Lake Mendocino water. The ordinance was suspended but could be imposed again if the Lake drops below the 30,000 AF level. Figure 6 shows that storage in Lake Mendocino increased significantly in January and February and is now at its historical average.

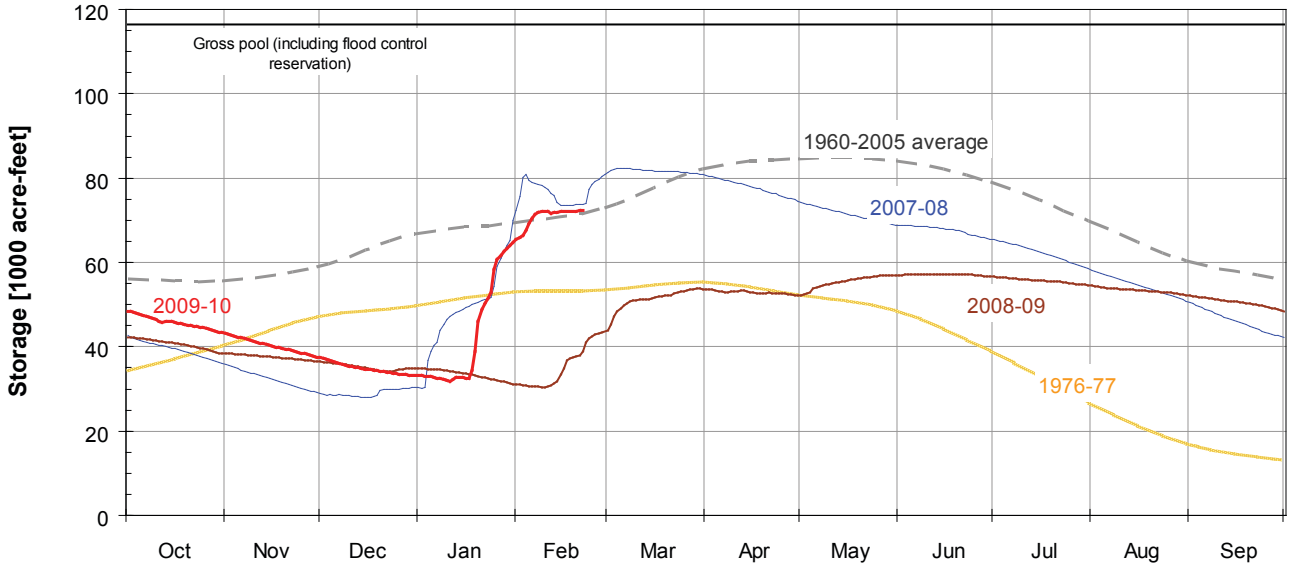

Figure 6. Storage in Lake Mendocino

Storage in Marin Municipal Water District reservoirs as of February 21 is above average at 91 percent of capacity compared to 54 percent of capacity at this time in 2009. Storage in Santa Clara Valley Water District reservoirs increased to about 65 percent of capacity near the end of February compared to about 42 percent at the beginning of January. Storage in Yolo County Flood Control and Water Conservation District's Indian Valley Reservoir, reported low in January has increased about 26 percent in February and is now at about 20 percent of capacity.

North Lahontan Hydrologic Region — Lake Tahoe's water level has remained above its natural rim (elevation 6223 feet) since January 24 and is at 6223.05 as of February 22. Recent storms continue to improve snowpack conditions for reservoirs in the Sierra.

South Coast, South Lahontan, and Colorado River Hydrologic Regions — In many parts of the region, recent storms have brought rainfall totals to slightly above normal levels for this time of year, however, reservoirs levels have not changed significantly from last month with overall storage still at under 50% of capacity. The consensus among regional water managers is that Southern California will continue to face significant supply challenges for years to come due to regulatory restrictions on pumping water from the Delta. As a result, local agencies continue to aggressively implement water conservation programs.

Water Conservation Actions by Local Water Agencies

As of February 23, 2010, there are 67 local water agencies in California that have mandated water conservation and 56 water agencies urging voluntary conservation measures. This is unchanged from the previous month. A current update of the number of agencies mandating conservation and urging voluntary conservation measures can be found at the Association of California Water Agencies (ACWA) website, http://www.acwa.com/issues/cadrought/

Planning for a Dry 2010

DWR continues to work on actions to prepare for the possibility California's drought continuing into 2010 and beyond. These include increased water conservation, 2010 water transfers, a long-term water transfer program, improvements to the California Irrigation Management Information System, and improved coordination of emergency response activities.

Although the state has experienced significant precipitation in 2010 during the months of January and February, drought planning continues because defining when a drought is over is dependent on a variety of factors and is somewhat subjective. In California, hydrology and precipitation can be extremely varied across the state. It is possible to have drought conditions exist in one area and not others.

We also know from past hydrologic records and from experiences in other areas of the US and other countries such as Australia, that it is not uncommon to have one or more average years within a continuing drought. Generally drought is a gradual crisis that takes several years to develop as stored water supplies are exhausted. Correspondingly, recovery from a drought would most likely take several years to replace stored water.

For more information on Planning for a Dry 2010, see our DWR link on Drought Planning and Preparedness at http://water.ca.gov/drought/planning.cfm

Drought Contingency Plan

DWR staff is preparing the 5-year statewide Drought Contingency Plan. The purpose of the drought contingency plan is to develop a coordinated State government strategy to prepare for, respond to, and recover from drought. This plan identifies an integrated approach to assessing drought conditions, drought action levels, and appropriate agency responses as drought conditions change.

Updated Model Water Efficiency Landscape Ordinance

On September 10, 2009, DWR released an updated Model Water Efficient Landscape Ordinance (Model Ordinance) to assist local governments in reducing water waste in landscapes. The Model Ordinance addresses water budgets for landscapes, the prevention of excessive erosion and irrigation runoff, landscape and irrigation design require-

ments, the use of recycled water where available, irrigation audits, and the scheduling of irrigation based on local climate. Local governments and urban water suppliers can adopt and implement the Model Ordinance, or a local ordinance that is at least as effective as the Model Ordinance.

California local agencies are adopting water conservation landscaping ordinances in order to comply with Assembly Bill 1881, the Water Efficient Landscape Act, requiring cities and counties, including charter cities and charter counties to adopt landscape water conservation ordinance by January 1, 2010. The notification deadline to DWR was January 31, 2010. As of February 23, DWR received notification from 240 cities, 28 counties, and 6 Water Districts; which constitutes about 50 percent of all cities and counties. DWR will submit a report to the legislature on the status of adopted ordinances by local agencies by January 31, 2011.

Summary

The current drought period beginning in 2007, has left a significant deficit in our reservoir's carry-over supplies. Water Year 2008-09 ended with 65 percent of average statewide runoff, with the Sacramento region Water Supply Index (WSI) classified as "Dry" and San Joaquin River region WSI classified as "Below Normal". Based on storage for key reservoirs at the end of the last three water years, the state entered the 2009-2010 Water Year, beginning October 1, with its key supply reservoirs at only 69 percent of average and 42 percent of capacity. The recent January storms have raised reservoir levels a little for the major reservoirs. However, with the exception of New Don Pedro, major reservoirs are well below the historical averages for end of January storage.


Photography: Westlands Water District

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